

by Mr. Bateson, on facts limiting our theories of inheritance; by Prof. C. O. Whitman, on orthogenesis in pigeons and on the relations of ontogeny and phylogeny; by Dr. L. O. Howard, on the recent progress of economic zoology; and by Prof. H. F. Osborn, on evolution from a palæontologist's point of view—all of them very remarkable and memorable expositions.

At the formal close of the congress it was announced that the 1910 meeting would be held at Graz under the presidency of Prof. von Graff. A welcome announcement was made that the committee on nomenclature had at last arrived unanimously at a code of rules which would cover 90 per cent. of all possible difficulties. Dr. Stiles further said that the committee would continue to sit in judgment on the remaining 10 per cent. of intricate difficulties, and that they had resolved to prepare a check-list of some thousands of common animals the names of which were not henceforth to be changed on any pretext whatsoever. As Prof. Agassiz remarked, the only difficulty remaining was the cheque. Prof. Blanchard announced that a third prize had been offered by Russia for adjudication by the congress and by representatives of the Zoological Society of St. Petersburg. It was offered to perpetuate the memory of the great Russian zoologist, Alexander Kowalevsky. In a very neat speech Prof. Hubrecht, of Amsterdam, thanked the local committee, the organisers, and the president for their indefatigable labours in making the congress a conspicuous success, and Prof. Blanchard, of Paris, eloquently expressed the gratitude of the ladies for the hospitality which had been shown them by the ladies of Boston.

NOTES.

THE weather conditions for the three summer months, June to August, have proved very disappointing, and the principal characteristic has been the entire absence of warm days. At Greenwich there have only been forty days during the whole period with a temperature of 70° and above. This is precisely the same number as in the phenomenally wet summer of 1903, but it is very greatly below the average. In 1860 there were only twenty-three days with a temperature of 70° or above, and in 1879 twenty-six such warm days, so that the past summer is not unique. There has not been, however, a single day this summer with a temperature of 80°, whilst in 1903 the thermometer touched that reading on six days. The aggregate rainfall at Greenwich for the three months was 5.29 inches, which is 1.37 inches less than the average of the past sixty years. In 1903 the aggregate for the corresponding three months was 16.17 inches, which is the wettest summer on record. At the London observing station of the Meteorological Office the aggregate rainfall for the three months was 4.76 inches, which is 2.13 inches below the normal, and the only month with an excess so far this year is April. June was generally wet over nearly the whole country, July was mostly dry, whilst in August the rainfall varied considerably in different parts of the kingdom. At Jersey the total measurement in August was 0.60 inch, whilst the average is 2.48 inches; at Valencia the measurement was 5.67 inches. The sunshine has not varied much from the average. In London there was a slight deficiency in each month, but in the aggregate for the three months it only amounts to thirty-eight hours. September has commenced with exceptionally cold weather, and the thermometer for the first four days has averaged about 30° lower than at the corresponding time last year.

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A REUTER telegram from Rome states that it is expected that ratifications will be received by the end of the present year from all the Powers of the convention of June 7, 1905, for the establishment of the proposed International Agricultural Institute. If the expectations are realised the committee of the institute will be able to meet early in 1908, enabling the institute itself to assemble in the autumn of that year, and to be in working order in 1909. In connection with the new institute, the Italian Government is taking steps for the scientific organisation of a system of agricultural statistics which existed until about ten years ago, when it was abolished by Count Guicciardini, Minister of Agriculture, on the ground that it did not afford sufficient guarantees of correctness. By way of experiment, agricultural statistics will be collected this year in fifteen provinces of Italy, with the view of extending the new system to the whole of the country, with any reforms that may be suggested by the experiment. At the same time a count will be taken of the livestock in the country, which has not been done for a considerable time. In this way Italy will in 1909 appear before the International Institute with complete agricultural returns.

THE installation of the first electric irrigation system in southern British Columbia has just taken place. It is considered that by this means the problem of the irrigation of several thousand acres of fruit lands will in a great measure be solved.

AN organisation to be known as the Universal Society of the White Cross of Geneva has been formed at Geneva. It has for its object the coordination of the work being carried on throughout the world in combating tuberculosis, cancer, epidemic and infectious diseases, and social evils such as alcoholism, &c.

ACCORDING to the *Engineer*, an Inter-Ministerial Technical Commission has been appointed by the French Minister of Public Works to organise the whole system of wireless telegraphy in all its branches in the country, and it is expected that the commission will be able to arrive at results which will furnish France with a very complete and properly coordinated service of wireless telegraphy for land and sea service, both in peace and war.

In 1859 Mr. U. A. Boyden, of Boston, deposited with the Franklin Institute the sum of 1000 dollars, to be awarded as a premium to any resident of North America who should show by experiment that light and other rays travel with the same velocity. According to the August number of the *Journal* of the Franklin Institute, the premium has just been awarded to Dr. P. R. Heyl, who has taken photographs in the blue and ultra-violet of the variable star Algol in the neighbourhood of its minima, and has shown that the time of minimum intensity of the blue photographs is so nearly identical with that of the ultra-violet that the speeds of the two radiations across the space between Algol and the earth cannot differ so much as one part in a quarter of a million.

THE following arrangements have been made for the opening of the winter session of certain of the London medical schools. At the Guy's Hospital Physical Society, on October 4, Dr. G. A. Gibson will read a paper entitled "Past and Present"; at King's College, on October 1, Dr. W. H. Allchin will give "Some Observations on the Present State of Medical Education in London"; at the Middlesex Hospital Mr. A. G. R. Foulerton will, on the same date, speak on "The Development of Preventive

Medicine in Relation to the Welfare of the State"; at University College Hospital, on October 2, the inaugural address will be given by Sir R. Douglas Powell; and at the Seamen's Hospital Society, on October 21, Sir Lauder Brunton will give the inaugural address. The session of the Pharmaceutical Society will be opened on September 30, when Prof. R. Meldola will speak on "The Scientific Training of the Pharmacist."

PRELIMINARY particulars of the ninth International Geographical Congress, to be held at Geneva from July 27 to August 6, 1908, are given in the September number of the *Geographical Journal*. Ten scientific excursions, some of which will take place before, others after, the congress, have been arranged for, each being conducted by an expert. Dr. J. Früh, of Zürich, will lead a party, of not more than twenty, for the study of the morphological phenomena of the Alps and their foothills. Another party, conducted by Dr. Lugeon, will study the phenomena of inverted folding in various parts of the Alps. An excursion will be devoted to high-level forestry, and will be led by M. Ernest Muret. The structure of the Jura, the plateau, and the Alps will be studied under the direction of Dr. H. Schardt. A botanical excursion will be made under the direction of Dr. C. Schroeter, the well-known authority on the flora of the Alps. A study of vegetation contrasts and the technique of botanical distribution will be undertaken under the guidance of Dr. J. Briquet, and one of glacial morphology under the guidance of Prof. Brückner. Prof. J. Brunhes and others will direct attention to the contrasts between fluvial and glacial erosion, while Prof. Schardt will explain the structure of the southern portion of the crystalline Alps. Lastly, a party under the guidance of Prof. E. Chaix will study the phenomena of chemical erosion, especially as displayed in the surface forms known as *lapiés*, or *Karrenfelder*, and in the Karst. The place of meeting is particularly favourable for the arrangement of instructive excursions, and these may be expected to be one of the most prominent features of the congress.

THE *Philippine Journal of Science* for June (ii., No. 3) is entirely occupied with a paper by Dr. Richard Strong on studies in plague immunity. The author concludes that general vaccination in endemic centres would be a valuable means in accomplishing the extermination of this pestilence, an important pronouncement at the present juncture, when plague is rampant in India.

PREVENTIVE inoculations against hydrophobia were received at the Pasteur Institute of Paris in 1906 by 773 persons, only two of whom died from the disease, and as one of these may be excluded for statistical purposes, seeing that hydrophobia manifested itself in less than a fortnight after the conclusion of the treatment, the results show the low mortality of 0.13 per cent. Only one of the patients came from England. The person who died in less than fifteen days after treatment had received a severe penetrating wound on the face; the other fatal case had been severely bitten on the nose on August 3, was treated at the institute from August 5 to 26, and died from hydrophobia on October 12.

THE second report of the Natal Government Museum—covering the year 1905—has just been published by Messrs. Adlard and Son, and tells of progress in all departments. In the period under review the following additions to the specimens in the museum were made:—in ethnology, 145; mammals, 98; birds, 81; anatomy, 82; reptiles and fishes, 19; invertebrates, 425; palæontology, 4; geology and

minerals, 1445. A native blacksmith's complete outfit, including a good specimen of skin-bellows, has been acquired by the ethnology department of the museum through the misbehaviour of its former owner, the police authorities of the colony having acted on the request made to them to forward to the museum all native articles which have been confiscated for wrongdoing.

IN a letter to the *Times* of August 28, Mr. James Brand states that intravenous injections of a mixture of aqueous solutions of methylene blue and corrosive sublimate cure trypanosome infections in horses, and suggests that this may be found to be a remedy for sleeping sickness. Trypanosoma infection, in man. Prof. Moore and his co-workers have found that corrosive sublimate enhances the curative value of atoxyl, another anilin dye, in experimental infections with the human trypanosome, but it does not follow that methylene blue would be of service in sleeping sickness, since Nicolle and Wenyon have found that an anilin dye which is curative for an infection with one trypanosome is not necessarily curative for other trypanosome infections.

THE fifth annual report of the Imperial Cancer Research Fund, which has been recently issued, contains the reports of the executive committee, of the general superintendent, Dr. Bashford, and of the honorary treasurer. The fund now possesses a capital sum of 118,275*l.* for the purposes of the work, including the munificent gift of 40,000*l.* by Mr. and Mrs. Bischoffsheim on the occasion of their golden wedding. Dr. Bashford gives a *résumé* of the experimental and other researches carried out during the past year. Attention has been given to testing various alleged cancer cures; unfortunately, it is impossible to assign a curative value to any of them. The much-vaunted trypsin is incapable of curing inoculated cancer in mice, or even of influencing the progressive growth of the tumours. The only means capable of freeing the inoculated mice from cancer is the surgical removal of the tumours.

IN an illustrated pamphlet published at La Plata ("La Reforma" Press, 1907), under the title of "El Origen del Hombre," Dr. Florentino Ameghino reiterates his opinion that South America was the birth-place of the human race. Man is traced back to the supposed Cretaceous family Microbiotheriidae—in other words, to Miocene opossums!

AMONG numerous articles in part i. of the fiftieth volume of Smithsonian Miscellaneous Collections, attention may be directed to a description, by Dr. Leo Walter, of Prague, of the structures by means of which the fore and hind wings of hymenopterous insects are linked together. After pointing out that homologous structures exist in the wings of certain other insects, such as many Lepidoptera, Cicadidae, and Thricoptera, the author observes that in none of these is the development so full and so complicated as in the Hymenoptera. Strange to say, these structures in the latter group appear never to have been worked out in full detail—an omission which Dr. Walter has endeavoured to supply. Facts of considerable interest have been discovered during the investigation, and it has been found that these organs possess much importance from a systematic point of view. Their object is, of course, to enable the two wings to act during flight as a single unit, and, as might have been expected, it turns out that the strongest flyers among the Hymenoptera are those in which the connection between the wings attains its fullest development. The halting and uncertain

flight not infrequently noticeable in individual humble-bees is attributed by the author to damaged wing-connections.

THE rapidly advancing study of spirochætes is at once of practical and scientific interest, of practical interest because these parasites occur in those "gustatory flashes of summer lightning," as Huxley said, which mortals call oysters, and because *Spirochaeta pallida* is believed to be the active cause of syphilis; of scientific interest, because it remains uncertain whether these protists are protozoa or bacteria. In a recent paper (Ann. Nat. Hist., xix., 1907, pp. 493-591), Mr. H. B. Fantham points out that the diffuse nuclei and transverse fission of spirochætes suggest bacteria, while, on the other hand, the presence of an undulating membrane, longitudinal fission, and even definite "chromosomes" suggest protozoa. It is to the latter interpretation that he inclines. Mr. Fantham has made a careful study of living spirochætes—*Spirochaeta balbiani* (Certes) from the oyster, and *S. anodontae* (Keysseltz) from the fresh-water mussel—and gives an interesting account of their puzzling movements. Their motion is resolvable into at least two components:—(1) a vibratory motion of flexion of the body, mainly for progression, and (2) a spiral or corkscrew movement of the body as a whole, due to the spirally wound membrane, which is composed of longitudinally arranged "myoneme" fibrillæ. The myonemes set up transverse movements on the surface of the body, manifested as waves passing down the body in a direction opposite to that in which the organism moves. The spirochætes seem to move more quickly than even trypanosomes, and with an added corkscrew motion. While flagella are present in the case of true Spirilla, they do not occur in spirochætes. What have been described as flagella or cilia by some investigators are really "myoneme" fibrils split off from the membrane during its rupture.

A DOUBLE number of *Le Bambou*, the first issue of this year, comprising Nos. 7 and 8, has been received. It contains a descriptive article on the aerial vegetative structures of bamboos, also notes on their cultivation and resistance to frost.

THE third number of vol. iii. of the Records of the Botanical Survey of India is appropriated to the determinations, by Dr. L. F. B. Baker, of new species belonging to the order Sapindaceæ, based on material from India and Malaya.

THE results obtained by de Vries have led botanists to examine closely the so-called variable species, as from such species special modifications or new characters may most reasonably be expected. In the *New Phytologist* (February) Dr. L. Cockayne refers to a New Zealand plant of this type, *Leptospermum scoparium*, with regard to colour modification. Ordinarily the flowers are white, but a pink-flowered form was introduced to cultivation as *Leptospermum Chapmanni*, and recently another plant, bearing rich crimson flowers, has been discovered growing wild. Seedling plants of the latter have been raised, so that from the next generation some idea as to the origin of the plant, whether a mutant or hybrid, may be obtained. In *Science* (April 12) Dr. G. H. Shull notes that he can distinguish four elementary species in the numerous specimens of *Capsella bursa-pastoris* he has cultivated, all of which breed true, and that without geographical or complete physiological isolation they maintain themselves distinct.

AN account in the *Kew Bulletin* (No. 7) of the proceedings in connection with the Linnean bicentenary celebrations at Upsala, Lund, and Stockholm accords with other descriptions in testifying to the enthusiastic and impressive nature of the ceremonies. Correspondence connected with the award of the special Linnean gold medal to Sir Joseph Hooker is also published. An article on new or little-known algae from eastern Asia is contributed by Mr. A. D. Cotton, in which a new alga from Ceylon, *Euptilota Fergusonii*, is described and figured. Dr. Otto Stapf communicates notes on two rubber plants, *Mascarenhasia elastica*, belonging to the order Apocynaceæ, that grows in British and German East Africa, and *Euphorbia fulva*, a tree known in Mexico as "Palo Amarillo." From the former balls of fair-quality rubber, known as "Mgoa," are prepared; the latex obtained from the latter contains a large percentage of resin, but a process of separation is said to have been devised. Mr. J. M. Hillier has collated information on Guayule rubber, the product of *Parthenium argentatum*, a shrubby composite of Mexico.

ACCORDING to the second part of the *Bergens Museum Aarbog* for the current year, Norway experienced an unusually small number of earthquake shocks in 1906, namely, thirteen, against twenty-three in 1905 and thirty-three in 1904. Mr. C. F. Kolherup, the author of the paper referred to, is of opinion that the comparative frequency of earthquakes in Norway is due to subsidence in the bed of the adjacent sea. In another article in the same issue Mr. J. Rekstad discusses ancient terraces and beach-lines in western Norway, illustrating his account with a number of reproductions from photographs.

IN the *Physikalische Zeitschrift* for August 15, Prof. F. Paschen gives the results of some careful measurements made by his pupil, Miss Stettenheimer, of the Zeeman effect in known magnetic fields for the lines Zn 4680 and Cd 4678 which behave normally. From the results he calculates by the theory of Lorentz the quotient of the electric charge on the ion by its mass, and obtains 1.79×10^7 . This agrees very well with the value 1.77×10^7 given by Messrs. P. Weiss and A. Cotton in the June number of the *Journal de Physique* as the result of their measurements. The values which have been obtained by different experimenters for the above quotient in the case of the cathode rays differ so much from each other that it is difficult to fix on a representative one for comparison with the above numbers. Prof. Paschen takes the value 1.88×10^7 given by Profs. Kaufmann and Simon, and is disposed to think that the difference between the values of the quotient in the two cases is due to some difference in the ions.

THE uncertainty as to the melting point of platinum, to which we referred a few weeks ago, is leading to corresponding uncertainties in all high-temperature determinations. Profs. C. E. Mendenhall and L. R. Ingersoll, in their paper on the melting points of rhodium and iridium in the July number of the *Physical Review*, are compelled to give two sets of values, one based on 1745°C. , the other on 1789°C. , as the melting point of platinum. They use the Nernst glower as a meltdometer, place a very small particle of the metal on it, and observe through a microscope for what current through the glower the particle melts. The temperature of the glower is determined by measurement of the isochromatic radiation, assumed to follow a law similar to Wien's, with constants determined from the melting points 1065°C. and 1745°C. or 1789°C. of gold and platinum. With 1789°C. as

basis, they give the following melting points:—silicon, 1452° C.; palladium, 1576° C.; rhodium, 1968° C.; indium, 2388° C.; the temperature of the glower at normal brilliancy 2480° C., the melting point of the glower material 2490° C.

THE atomic weight of radium was determined five years ago by Mme. Curie on about 0.09 gram of a highly purified radium chloride. Large quantities of Joachimsthal pitchblende residues have since then been worked up, and from these 0.4 gram of pure radium chloride has been obtained. The method of purification adopted was reprecipitation from weak hydrochloric acid and fractional precipitation of the aqueous solution by alcohol, the progress of the purification from barium being followed by means of the spectroscope. It seemed desirable to repeat the determination of the atomic weight on the larger quantity now available, and Mme. Curie gives an account of the method adopted in the current number of the *Comptes rendus* (No. 8, August 19). Difficulties were encountered owing to the presence of traces of impurities in the reagents, leading to a gradual loss of radium during the purification, and a detailed account is given of the elaborate precautions found to be necessary for the preparation and preservation of the reagents used. The atomic weight deduced from the ratio radium chloride: silver chloride is 226.2 ($Ag=107.8$, $Cl=35.4$), or 1.2 units higher than the value found on 0.09 gram in 1902. It is shown that the slight increase of purity of the 1907 over the 1902 preparation is not sufficient to account for the rise of 1.2 units in the atomic weight, the difference being most probably due to the loss of accuracy on the determinations with the smaller quantity and the use of reagents not properly purified.

THE August number of the *Journal of the Institution of Electrical Engineers* (No. 185, vol. xxxix.) contains, amongst others, a paper on the technical training of electrical artisans, read by Mr. C. P. C. Cummings before the Dublin local section of the institution. The subject is one which is rarely treated in papers read before the Institution of Electrical Engineers or the branch sections, but, at the same time, it is one which is very important to the future development of electrical work. The term electrical artisan, as referred to by Mr. Cummings in his paper, deals almost entirely with those electrical artisans who are generally classified as "wiremen," and the paper treats of the possibilities of improving the existing methods by which such men are trained at the present day, so that more efficient workmen may be obtainable. Mr. Cummings very rightly points out that there is a very large majority of the "so-called wiremen" obtaining the maximum rate of wages per hour, which the highly trained and competent workman is fully entitled to, who cannot be placed in the same class with him, and can obtain this rate without any trouble. This in itself is evidence of the serious defect in the method by which electrical artisans are produced. So long as these methods continue, they will produce a considerable number of men who cannot be considered fully competent, but very few first-class artisans, and from this very fact the really competent men consider themselves so strong by virtue of their minority that their demands upon employers and their general independence greatly reduce their utility. Mr. Cummings describes the present method of training electrical artisans, and points out the faults of the system and propounds a scheme which is well worth the consideration of educational authorities and employers—especially the latter—for until

the employers take a practical interest in this matter they cannot hope to obtain the man most suited to their requirements.

MESSRS. JOHN J. GRIFFIN AND SONS, LTD., of Kingsway, have just issued a new edition of "Chemical Handicraft," giving particulars (in many cases illustrated) of the chemical apparatus and reagents manufactured and sold by them. Science teachers will find the volume very handy for reference.

THE lectures delivered under the Silliman foundation at Yale University in March, 1905, by Prof. E. Rutherford, F.R.S., which were afterwards issued in book form under the title of "Radio-active Transformations," have now been translated into German by Dr. Max Levin, of Göttingen, and published by F. Vieweg and Son, Brunswick. Brief reference is made in the volume, in the form of footnotes, to the more important advances in the subject which have taken place since the first appearance of the work in English.

OUR ASTRONOMICAL COLUMN.

DANIEL'S COMET, 1907d.—The following is a continuation of the ephemeris for comet 1907d given in No. 4196 of the *Astronomische Nachrichten* (No. 437, August 23):—

Ephemeris 12h (U.S.N. Berlin).

1907	α (true) h. m.	δ (true) h. m.	$\log r$	$\log \Delta$	Brightness
Sept. 9	9 45.5	11 57	9.7250	0.1139	13.7
" 11	9 55.3	10 26.0			
" 13	10 47	9 45.9	9.7495	0.1408	10.8
" 15	10 15.7	9 55			
" 17	10 26.3	8 25.1	9.7818	0.1654	8.3
" 19	10 36.5	7 44.9			

It will be noticed that the brightness of this object is declining rapidly, and, as the comet rises nearer and nearer to sunrise, it is becoming increasingly difficult to observe. At present it rises about two hours before the sun, and on September 19 it will precede the sun by about $1\frac{1}{2}$ hours, rising about 12° north of east.

Comptes rendus, No. 8 (August 19) contains the results of observations made by M. E. Esclangon at Bordeaux. The head of the comet was extraordinarily bright and of about $5'$ diameter on August 1. Seven tails were seen, the extreme streamers being much shorter than the median. A reproduction of the observer's drawing shows the disposition of the tails.

SOLAR OBSERVATIONS AT CARTUJA, GRANADA.—In an extract from No. 3 (1907) of the *Bulletin de la Société belge d'Astronomie*, M. J. Mier y Terán, S.J., publishes an account of the solar observations and reductions now carried on at the Observatory of Cartuja-Granada (Spain).

Solar observations were commenced at the beginning of 1905 for obtaining statistics relating to sun-spots and faculae. In January, 1906, photography was substituted for eye observations for the purpose of obtaining more precise measures, and photographs have since been secured on each clear day. A more suitable photoheliograph has recently been erected having an objective of 94 mm. ($3\frac{7}{8}$ inches) aperture and 1.50 m. focal length, and fitted with a direct enlarger giving a solar image of about 10 cm. (4 inches) diameter. The areas and positions of the spots, &c., are measured with a Hilger micrometer, the positions afterwards being reduced to heliocentric coordinates in the usual manner, and it is hoped that the results will be found sufficiently precise to supplement the Greenwich measures. As it is proposed to publish these results in the tri-monthly numbers of the observatory bulletin, it may be expected that solar workers will find them available without having to wait for the Greenwich annual publications. Spectroscopic observations of the sun and the stars are also being carried on at Cartuja, and it is hoped that ere long the apparatus for spectro-photography with a large dispersion will be installed.